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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/496,506	02/02/2000	Munir H. Nayfeh	1201.63407	6344

24978 7590 06/29/2004

GREER, BURNS & CRAIN  
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CHICAGO, IL 60606

EXAMINER
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CRANE, SARA W

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/496,506	<b>Applicant(s)</b> NAYFEH ET AL.	
	<b>Examiner</b> Sara W. Crane	<b>Art Unit</b> 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 9 April 2004 (RCE filing).
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12 is/are allowed.
- 6) ☒ Claim(s) 1, 4-8 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 4, 5, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forbes et al. in view of Pankove et al. and Chen et al.

As noted at length in the record, Forbes teaches each element of for example claim 1, where particles of uniform size distribution are taught specifically at column 4, lines 65-66, and where 1 nm or 10 Angstroms is specifically mentioned as a diameter. The uniform size distribution is desirable to obtain uniform tunneling. Alternatively, Pankove et al. teaches at column 5, that it is known to produce uniform sized quantum dots each about 10 angstroms in diameter and depth. It would have been obvious to produce particles of uniform size distribution and about 10 Angstroms in diameter as taught by Pankove et al. for use in a Forbes device, because Forbes teaches the need for such particles. Chen et al. also teaches uniform sized quantum dots of 1 to 2 nm thick, and where the diameter is comparable the thickness, as in the figures. This provides further evidence that dots of approximately 1 nm diameter are known in the art.

### ***Claim Rejections - 35 USC § 112***

Claims 5-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter

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which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 5-7 are, alternatively, rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As noted in the Office action of 6 May 2003, in the paragraph spanning pages 2 and 3, single particle tunneling as explicitly set forth in claim 5-7 as not actually been shown, and would require undue experimentation to produce. This also may be viewed as a failure to comply with the written description requirement, because, in an unpredictable art, merely sketching a diagram of a desired phenomenon is not enough to allow one of ordinary skill to accomplish the desired end.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1, 4, 5, and 8 above, and further in view of Matsumura et al.

See reasons of record.

***Allowable Subject Matter***

Claims 9-12 are allowed.

Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant's arguments have been considered, but are not convincing. Examiner reads the Forbes references as teaching explicitly a uniform particle size distribution. The teaching is clear, and is consistent with known mechanisms for producing uniform sized particles, where particle size depends primarily on reaction temperature, for example. The other references also provide evidence that uniform sized nanocrystals have been formed. With respect to the rejection under 35 U.S.C. 112, examiner believes that the art of single particle tunneling is not predictable, such that one can generalize from the experimental data shown in the specification, to show enablement for a device having a gate, and requiring tunneling between source and drain.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist, whose telephone number is (571) 272-1562.

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A handwritten signature in black ink, appearing to read "Sara W. Crane". The signature is fluid and cursive, with the first name "Sara" being more prominent than the last name "Crane".

Sara W. Crane  
Primary Examiner  
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